

Those skilled in the art will appreciate variations of the above-described embodiments that fall within the scope of the invention. As a result, the invention is not limited to the specific examples and illustrations discussed above, but only by the following claims and their equivalents.

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**CLAIMS:**

We claim:

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1. A method for communicating between a communications device and a network system, the method comprising:

receiving a request for a communication service into a base station system over a wireless transmission link;

in response to receiving the request, dynamically configuring a media access control (MAC) layer in the wireless transmission link for the requested communication service; and

generating and transmitting an instruction to provide the requested communication service over the wireless transmission link using the dynamically configured MAC layer.

2. The method of claim 1 wherein dynamically configuring the MAC layer in the wireless transmission link further comprises:

identifying a section of the MAC layer of the wireless transmission link for the requested communication service;

arbitrating access between the request and other requests for communication services for a position in the section of the MAC layer in the wireless transmission link; and

identifying the position in the section of the MAC layer for the requested communication service based on the arbitration of access.

3. The method of claim 2 wherein identifying the section of the MAC layer of the wireless transmission link for the requested communication service further comprises identifying a control family for the requested communication services wherein the control family relates to the section of the MAC layer.

4. The method of claim 2 wherein identifying the section of the MAC layer of the wireless transmission link for the requested communication service further comprises executing allocation rules to identify the section of the MAC layer for the requested communication service.

5. The method of claim 4 wherein the allocation rules are based on a control objective.

6. The method of claim 5 wherein the control objective is to maintain all traffic flowing during peak load of traffic.

7. The method of claim 5 wherein the control objective is to continually exchange high priority traffic between the communication device and the network system.

8. The method of claim 5 wherein the control objective is to reduce capacity for low priority traffic during congestion periods.

9. The method of claim 5 wherein the control objective is to use a plausibility check for verifying actual traffic usage of capacity in the MAC layer in the wireless transmission link with historical trends of traffic usage of capacity in the MAC layer in the wireless transmission link.

10. The method of claim 2 wherein arbitrating access is further comprised of prorating among communication services based on usage parameter control values.

11. The method of claim 2 wherein arbitrating access is further comprised of using first come first serve logic.

12. The method of claim 2 wherein arbitrating access is further comprised of using last come first serve logic.

13. The method of claim 2 wherein arbitrating access is further comprised of using fair queuing logic.

14. The method of claim 2 wherein arbitrating access is further comprised of using burst servicing logic.

15. The method of claim 2 wherein arbitrating access is further comprised of using time of expiry logic.

5 16. The method of claim 1 wherein the communication service is voice communication.

17. The method of claim 1 wherein the communication service is facsimile communication.

10 18. The method of claim 1 wherein the communication service is modem communication.

19. The method of claim 1 wherein the communication service is audio broadcast.

15 20. The method of claim 1 wherein the communication service is world wide web browsing.

21. The method of claim 1 wherein the communication service is file transfer.

20 22. The method of claim 1 wherein the communication service is data transfer.

23. The method of claim 1 wherein the communication service is a network game.

25 24. The method of claim 1 wherein the communication service is chat room communication.

25 25. The method of claim 1 wherein the communication service is e-mail.

30 26. The method of claim 1 wherein the communication service is PUSH technology communication.

27. The method of claim 1 wherein the communication service is desktop multimedia communication.

28. The method of claim 1 wherein the communication service is video broadcast.

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29. The method of claim 1 wherein the communication service is video conferencing.

30. The method of claim 1 wherein dynamically configuring the MAC layer in the wireless transmission link is based on delivery requirements of communication services.

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31. The method of claim 30 wherein the delivery requirement is time dependency.

32. The method of claim 30 wherein the delivery requirement is a need for real time communication.

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33. The method of claim 30 wherein the delivery requirement is quality of service.

34. The method of claim 30 wherein the delivery requirement is traffic pattern.

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35. The method of claim 30 wherein the delivery requirement is bandwidth.

36. The method of claim 30 wherein the delivery requirement is grade of service.

37. The method of claim 1 wherein the MAC layer of the wireless transmission link further comprises a fixed allocation sub frame and a dynamic allocation sub frame.

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38. The method of claim 37 wherein the fixed allocation sub frame further comprises requests slots for reservation information.

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39. The method of claim 37 wherein the fixed allocation sub frame further comprises constant bit rate slots for voice packets.

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40. The method of claim 37 wherein the dynamic allocation sub frame further comprises variable bit rate slots for variable bit rate packets.

5 41. The method of claim 37 wherein the dynamic allocation sub frame further comprises data slots for data packets.

42. A software product comprising:

10 communication software operational when executed by a processor to direct the processor to receive a request for a communication service into a base station system over a wireless transmission link, in response to receiving the request, dynamically configure a media access control (MAC) layer in the wireless transmission link for the requested communication service, and generate and transmit an instruction to provide the requested communication service over the wireless transmission link using the dynamically  
15 configured MAC layer; and

a software storage medium operational to store the communication software.

43. The software product of claim 42 wherein the communication software is operational when executed by the processor to direct the processor to:

20 identify a section of the MAC layer of the wireless transmission link for the requested communication service;

arbitrate access between the request and other requests for communication services for a position in the section of the MAC layer in the wireless transmission link; and

25 identify the position in the section of the MAC layer for the requested communication service based on the arbitration of access.

30 44. The software product of claim 43 wherein the communication software is operational when executed by the processor to direct the processor to identify a control family for the requested communication services wherein the control family relates to the section of the MAC layer.

45. The software product of claim 43 wherein the communication software is operational when executed by the processor to direct the processor to execute allocation rules to identify the section of the MAC layer for the requested communication service.

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46. The software product of claim 45 wherein the allocation rules are based on a control objective.

47. The software product of claim 46 wherein the control objective is to maintain all traffic flowing during peak load of traffic.

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48. The software product of claim 46 wherein the control objective is to continually exchange high priority traffic between the communication device and the network system.

49. The software product of claim 46 wherein the control objective is to reduce capacity for low priority traffic during congestion periods.

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50. The software product of claim 46 wherein the control objective is to use a plausibility check for verifying actual traffic usage of capacity in the MAC layer in the wireless transmission link with historical trends of traffic usage of capacity in the MAC layer in the wireless transmission link.

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51. The software product of claim 43 wherein the communication software is operational when executed by the processor to direct the processor to prorate among communication services based on usage parameter control values.

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52. The software product of claim 43 wherein the communication software is operational when executed by the processor to direct the processor to use first come first serve logic.

53. The software product of claim 43 wherein the communication software is operational when executed by the processor to direct the processor to use last come first serve logic.

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54. The software product of claim 43 wherein the communication software is operational when executed by the processor to direct the processor to use fair queuing logic.

5 55. The software product of claim 43 wherein the communication software is operational when executed by the processor to direct the processor to use burst servicing logic.

56. The software product of claim 43 wherein the communication software is operational when executed by the processor to direct the processor to use time of expiry logic.

10 57. The software product of claim 42 wherein the communication service is voice communication.

15 58. The software product of claim 42 wherein the communication service is facsimile communication.

59. The software product of claim 42 wherein the communication service is modem communication.

20 60. The software product of claim 42 wherein the communication service is audio broadcast.

61. The software product of claim 42 wherein the communication service is world wide web browsing.

25 62. The software product of claim 42 wherein the communication service is file transfer.

63. The software product of claim 42 wherein the communication service is data transfer.

30 64. The software product of claim 42 wherein the communication service is a network game.



65. The software product of claim 42 wherein the communication service is chat room communication.

5 66. The software product of claim 42 wherein the communication service is e-mail.

67. The software product of claim 42 wherein the communication service is PUSH technology communication.

10 68. The software product of claim 42 wherein the communication service is desktop multimedia communication.

69. The software product of claim 42 wherein the communication service is video broadcast.

15 70. The software product of claim 42 wherein the communication service is video conferencing.

20 71. The software product of claim 42 wherein the communication software is operational when executed by a processor to direct the processor to dynamically configure the MAC layer in the wireless transmission link based on delivery requirements of communication services.

25 72. The software product of claim 71 wherein the delivery requirement is time dependency.

73. The software product of claim 71 wherein the delivery requirement is a need for real time communication.

74. The software product of claim 71 wherein the delivery requirement is quality of service.

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75. The software product of claim 71 wherein the delivery requirement is traffic pattern.

76. The software product of claim 71 wherein the delivery requirement is bandwidth.

77. The software product of claim 71 wherein the delivery requirement is grade of service.

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78. The software product of claim 42 wherein the MAC layer of the wireless transmission link further comprises a fixed allocation sub frame and a dynamic allocation sub frame.

79. The software product of claim 78 wherein the fixed allocation sub frame further comprises requests slots for reservation information.

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80. The software product of claim 78 wherein the fixed allocation sub frame further comprises constant bit rate slots for voice packets.

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81. The software product of claim 78 wherein the dynamic allocation sub frame further comprises variable bit rate slots for variable bit rate packets.

82. The software product of claim 78 wherein the dynamic allocation sub frame further comprises data slots for data packets.

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83. A wireless communication system for communicating between a communications device and a network system, the communication system comprising:

5 a subscriber unit system that is configured to transmit a request for a communication service for the communication device, exchange communications for the communication service with the communication device over a wireless transmission link identified in an instruction using a dynamically configured media access control (MAC) layer; and

10 a base station system that is configured to receive the request over the wireless transmission link for the communication service, in response to receiving the request, dynamically configure the MAC layer in the wireless transmission link for the requested communication service, and generate and transmit the instruction.

84. The wireless communication system of claim 83 wherein the base station system is configured to:

15 identify a section of the MAC layer of the wireless transmission link for the requested communication service;

arbitrate access between the requests and other requests for communication services for a position in the section of the MAC layer in a wireless transmission link; and

20 identify the position in the section of the MAC layer for the requested communication service based on the arbitration of access.

85. The wireless communication system of claim 84 wherein the base station system is configured to identify a control family for the requested communication services wherein the control family relates to the section of the MAC layer.

25 86. The wireless communication system of claim 84 wherein the base station system is configured to execute allocation rules to identify the section of the MAC layer for the requested communication service.

87. The wireless communication system of claim 86 wherein the allocation rules are based on a control objective.

88. The wireless communication system of claim 87 wherein the control objective is to maintain all traffic flowing during peak load of traffic.

89. The wireless communication system of claim 87 wherein the control objective is to continually exchange high priority traffic between the communication device and the network system.

90. The wireless communication system of claim 87 wherein the control objective is to reduce capacity for low priority traffic during congestion periods.

91. The wireless communication system of claim 87 wherein the control objective is to use a plausibility check for verifying actual traffic usage of capacity in the MAC layer in the wireless transmission link with historical trends of traffic usage of capacity in the MAC layer in the wireless transmission link.

92. The wireless communication system of claim 84 wherein the base station system is configured to prorate among communication services based on usage parameter control values.

93. The wireless communication system of claim 84 wherein the base station system is configured to use first come first serve logic.

94. The wireless communication system of claim 84 wherein the base station system is configured to use last come first serve logic.

95. The wireless communication system of claim 84 wherein the base station system is configured to use fair queuing logic.

96. The wireless communication system of claim 84 wherein the base station system is configured to use burst servicing logic.

5 97. The wireless communication system of claim 84 wherein the base station system is configured to use time of expiry logic.

98. The wireless communication system of claim 83 wherein the communication service is voice communication.

10 99. The wireless communication system of claim 83 wherein the communication service is facsimile communication.

100. The wireless communication system of claim 83 wherein the communication service is modem communication.

15 101. The wireless communication system of claim 83 wherein the communication service is audio broadcast.

20 102. The wireless communication system of claim 83 wherein the communication service is world wide web browsing.

103. The wireless communication system of claim 83 wherein the communication service is file transfer.

25 104. The wireless communication system of claim 83 wherein the communication service is data transfer.

30 105. The wireless communication system of claim 83 wherein the communication service is a network game.

106. The wireless communication system of claim 83 wherein the communication service is chat room communication.

5 107. The wireless communication system of claim 83 wherein the communication service is e-mail.

108. The wireless communication system of claim 83 wherein the communication service is PUSH technology communication.

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10 109. The wireless communication system of claim 83 wherein the communication service is desktop multimedia communication.

110. The wireless communication system of claim 83 wherein the communication service is video broadcast.

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111. The wireless communication system of claim 83 wherein the communication service is video conferencing.

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112. The wireless communication system of claim 83 wherein the base station system that is configured to dynamically configure the MAC layer in the wireless transmission link is based on delivery requirements of communication services.

113. The wireless communication system of claim 112 wherein the delivery requirement is time dependency.

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114. The wireless communication system of claim 112 wherein the delivery requirement is the need for real time communication.

30 115. The wireless communication system of claim 112 wherein the delivery requirement is quality of service.

116. The wireless communication system of claim 112 wherein the delivery requirement is traffic pattern.

5 117. The wireless communication system of claim 112 wherein the delivery requirement is bandwidth.

118. The wireless communication system of claim 112 wherein the delivery requirement is grade of service.

119. The wireless communication system of claim 83 wherein the MAC layer of the wireless transmission link further comprises a fixed allocation sub frame and a dynamic allocation sub frame.

15 120. The wireless communication system of claim 119 wherein the fixed allocation sub frame further comprises requests slots for reservation information.

121. The wireless communication system of claim 119 wherein the fixed allocation sub frame further comprises constant bit rate slots for voice packets.

20 122. The wireless communication system of claim 119 wherein the dynamic allocation sub frame further comprises variable bit rate slots for variable bit rate packets.

25 123. The wireless communication system of claim 119 wherein the dynamic allocation sub frame further comprises data slots for data packets.

30 124. The wireless communication system of claim 83 wherein the subscriber unit system further comprises a communication interface system, a multiplexer, and a subscriber wireless transceiver.

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125. The wireless communication system of claim 83 wherein the base station system further comprises a base wireless transceiver, a multiplexer, a connection admission control system, and a network interface system.

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